

Those with allergic asthma face double trouble during flu season, findings suggest

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New research from UT Southwestern Medical Center suggests that allergic reactions to pet dander, dust mites and mold may prevent people with allergic asthma from generating a healthy immune response to respiratory viruses such as influenza.

"Our findings imply that the better your asthma is controlled, the more likely you are to have an appropriate response to a virus," said Dr. Michelle Gill, assistant professor of pediatrics and internal medicine at UT Southwestern and lead author of the study appearing online and in the June edition of the [Journal of Immunology](#). "When individuals with asthma come in contact with an allergic trigger and a [respiratory virus](#), the allergen may actually interfere with the [immune response](#) to the virus. This interruption in the antiviral response may contribute to exacerbations of asthma that are commonly associated with respiratory viral infections."

More than half of the 20 million people diagnosed with asthma in the U.S., including 2.5 million children, have been diagnosed with allergic asthma.

Fifty-six people ranging in age from 3 to 35 participated in the study. Twenty-six of the participants suffered from allergic asthma; the remaining 30 made up the control group. Most of the participants were African-American, and the mean age was 15 years in both the asthma and control groups. In addition, those in the asthma group had been diagnosed by a physician and had a positive skin test to at least one

indoor allergen.

Researchers first isolated [immune cells](#) called dendritic cells from study participants. These cells are found in blood and tissues that are in contact with the environment, such as skin and the linings of the nose and lungs. When they encounter respiratory viruses such as flu, dendritic cells normally produce proteins that help the body mobilize the immune system and overcome the viral infection. When the dendritic cells first encounter an allergic stimulus, however, they are significantly impaired in their ability to produce such antiviral proteins.

When investigators exposed the dendritic cells from the study participants with allergic asthma to influenza, they found that the cells were unable to produce interferon, an immune system protein that plays a key role in fighting off repeated infections of the same virus. Interferon is what makes a person feel run down and tired when fighting viral infections.

The researchers speculate that the immune-suppressing effect of the allergic stimulation of dendritic cells might be related to the high levels of a molecule called IgE normally found in people with allergic asthma. Among the subjects participating in this study, elevated IgE levels were associated with impaired capacity of dendritic cells to produce interferon when exposed to flu.

Dr. Gill said these findings suggest that when the cold/flu and allergy seasons collide, the immune response in individuals with allergic asthma may worsen their disease.

"These findings imply that allergic triggers associated with exposure to indoor allergens like pet dander and dust mites can potentially render cells deficient in responding to a virus," Dr. Gill said. "It may - although this remains to be proven - also explain why asthmatics who are sensitive

to indoor allergens often experience asthma exacerbations when they acquire respiratory viral infections."

The findings from this study prompted an upcoming mechanistic study of dendritic cells as part of the Inner City Asthma Consortium (ICAC), which receives funding through the National Institute of Allergy and Infectious Diseases. The dendritic cell component of the ICAC study will investigate whether a treatment to lower IgE in [allergic asthma](#) patients will improve dendritic cells' response to allergens and respiratory viruses. UT Southwestern is among 10 institutions involved in the ICAC, which is administered by the University of Wisconsin-Madison.

Provided by UT Southwestern Medical Center

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